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GINSENG

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Ginseng (Panax quinquefolius L.) is native in rich, cool woods from Quebec and Manitoba, south to northern Florida, Alabama, Louisiana and Arkansas. The plant is about a foot tall; the leaves usually have five leaflets; the mature roots are large and spindle-shaped, often forked; the fruits are borne in clusters and when ripe, are bright red. The plant was formerly abundant but is now scarce due to collection of the wild material over a period of years. It is this species which is cultivated in America and occasionally elsewhere.

Asiatic Ginseng (Panax ginseng C. A. Mey.), is more appreciated than the American kind in some markets. It is not cultivated in America, but is successfully grown in Japan and Korea, perhaps also elsewhere, and is also collected from the wild.

USES OF GINSENG

Ginseng has been used as a medicinal for treatment of most of the ills to which the flesh is heir. Youngken (2) says only that "Ginseng is used by the laity as a stimulant and aromatic bitter. The Chinese also employ it as an aphrodisiac and heart tonic but without scientific justification." There is no essential difference between the kinds of ginseng.

TRADE IN GINSENG

It has been estimated that 98 percent of the ginseng collected or grown in America is exported to Hong Kong from whence much finds its way into areas with large Chinese populations, Malaya, Formosa, Indochina,

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Indonesia, and others. Little American ginseng is sent into China, although some is probably smuggled in, for China normally exports a small amount to Hong Kong. Ginseng is often sold and resold by speculators in Hong Kong. It is a high-priced luxury item by the time it reaches the consumer.

Ginseng has been in foreign trade from America since the early 1700's. Most root, until the beginning of this century, came from wild plants. Root from cultivated plants now supplies a large part of the demand. Ginseng is sent to the Hong Kong market from Canada, the United States, China, Japan (largest supplier), Korea and other countries.

During the fiscal year 1955-56, 114,000 pounds of ginseng were exported from the United States. The value of this root was given as \$1,885,000 for customs purposes. It has been estimated that the 1957-58 crop will be some 10-15 percent greater.

#### PROFITS FROM GINSENG

There seems to be no question that a profit can be made from the culture of ginseng under present market conditions, by a grower who is willing to expend the hand labor necessary to grow the crop. It is not an easy crop to grow, but can be grown by a reasonably good plantsman. It should not be experimented with by inexperienced growers looking for a quick profit from a small investment of labor and capital.

The cultivation of Ginseng offers no royal road to wealth. Claims of a fortune easily made for little expenditure in capital, time and labor should be investigated carefully and critically.

The price of ginseng root fluctuates from year to year, even from month to month. Roots from wild plants are the most desired. The price for roots from cultivated plants of top grade is about sixty percent of the price for

top grade wild material.<sup>1/</sup> Cultivated roots are heavier and more uniform, qualities not considered desirable by the Chinese.

#### POTENTIAL MARKET

The export of ginseng has been more than 100,000 pounds annually in recent years. The price in mid-1957 reached \$24.00 a pound but decreased about twenty percent as a result of an estimate that the crop would be 10-15 percent greater than normal. There is a relatively limited market for ginseng and a significant increase in cultivated acreage might be expected to have a depressing effect on the market.

There are no statistics to indicate the acreage or number of new plantings that have been started as a result of the relatively high prices of root during 1957. A ginseng crop matures in 5 to 7 years and an increased amount of root should begin to appear about 1962. This increase could be offset, in part, by a smaller harvest of wild root.

#### PLANTING MATERIAL

Planting material is of two kinds; seeds and seedlings. There are no outstanding cultural varieties of American ginseng although nursery stock from the northern part of the country may be preferable. The beginner should try to get the best quality and cleanest plants and seeds to begin. There are suppliers who have been in business for many years who can supply satisfactory business references. If your purchase of planting material is to represent considerable money, request a bank reference from the supplier and verify it before you buy.

<sup>1/</sup>Information in letter of J. Snowiss, Snowiss Fur Co., Williamsport, Pa.

Planting materials may also be transplanted from the wild if the plant occurs naturally in your region.

SEEDS: Seed may be obtained from several suppliers. They ripen in the fall, but usually do not germinate until the following fall. They must be "stratified" until they are to be used. Stratification consists of storing the seeds, as soon as collected, in a cool, moist place, using moist forest soil, sand, loam, or sawdust as a storage medium.

The use of seeds instead of seedlings may avoid the carrying of diseases to new plantations on roots. This is also the least expensive way to start a plantation, but requires a longer time until harvest.

SEEDLINGS: Several firms offer seedlings two to three years old as planting stock. Seedlings offer the advantage that a crop will be ready sooner than from seed; and that some seed should be produced from 3-year-old seedlings the first fall after planting. Seed may be considered part of crop for it usually is saleable. The disadvantages of seedlings are their greater initial cost and the possibility of bringing in disease along with the roots. Seeds, and one, two, and three year old seedlings will start the rotation which is necessary to produce a crop each year. From this point the plantation should provide sufficient seed for its increase and continuation.

#### PLANTING

If seeds are to be sown into the permanent beds, they may be set about 8 inches apart, each way. If they are sown in a seed-bed, 2 by 6 inches is sufficient space. Plants transplanted to permanent beds, after 2 or 3 years, in the seed beds, should be placed 8 inches apart each way. Closer spacing of seeds or plants may tend to increase disease in the plantation. Seeds may

be covered with one inch of forest soil, duff, or well-rotted sawdust from basswood or hickory. They should usually be sown in late fall. Roots may be transplanted in October or later, if the soil is in suitable condition, and the crowns placed about two inches below the surface. The surface of the beds may be nearly flat or somewhat rounded. The centers should be high enough so excess rain will run off and be carried away in the runways between the beds. Detailed instructions can be obtained from experienced suppliers. Permanent beds should be about 4 feet wide.

#### SHADE

Ginseng requires enough shade to cut out about three quarters of the sunlight. This may be accomplished by planting in the woods or by building lath sheds, both of which permit free circulation of the air. Laths should run north and south to provide alternating sun and shade to the plants. High shade is preferred by many growers.

#### FERTILIZING

Most growers prefer to prepare the beds with good forest soil or good loam with rotted leaves and a small amount of bone-meal mixed in before planting. Many advise against the use of commercial fertilizers or barn-yard manures after the bed has been planted. Forcing caused by fertilizing may reduce resistance of the plant to disease.

#### MULCH

Mulch is needed in most plantations. Leaves, straw, or other mulch not attractive to mice will be satisfactory. A mulch of 4 or 5 inches of leaves, or their equivalent, is sufficient in the coldest climates, much less is needed in the south. A light mulch to retain moisture may be ad-

viseable during dry periods. The mulch may be put in place just before the first frost, and removed in spring before new shoots start.

#### DRAINAGE

Excess moisture, on the surface or in the soil, must be drained away. The type of drainage will depend on the soil and any method of efficient drainage will be satisfactory.

#### FOREST PLANTINGS

Forest plantings of ginseng should be in reasonably dense shade produced by tall hardwood trees. North-sloping lands are preferred by some growers, providing cooler situations in summer. Crops from forest plantings are said to be about half those obtained in lath sheds, but costs are also much less. Culture in forest plantings is the same as in beds in artificial shade. Forest plantings have not been successful on the Pacific coast.

#### PROTECTION

Provision should be made to exclude wild or domestic animals from the plantation. Moles and mice may cause damage to the roots if not controlled. Theft may become a problem with this high value crop.

#### DIGGING AND DRYING OF ROOTS

Cured ginseng roots are valued by the Chinese for their size, maturity, color and especially for some imponderable characteristics such as conformation. Although there seems to be no difference chemically between wild and cultivated root, the lighter, diverse wild root is preferred. Cultivated ginseng probably should not be harvested until six years old. It is harder, cleaner, heavier, and more uniform than wild root. Harvesting may be done when the growing season is over, usually September or later.

The roots may be spread carefully on netting or in trays and dried in well-ventilated rooms. The drying process may begin at relatively low temperatures, 60-70 degrees F. and later increased to 90 degrees F. Some growers prefer to start drying at 100-110 degrees and decrease the temperatures to about 90 degrees as soon as the roots wilt. Overheating should be avoided. Drying may require six weeks for large roots. The roots should be examined and turned frequently. Care should be taken to avoid marring or breaking the roots. Dry roots may be stored in a dry, well-ventilated place and protected from vermin, until ready for sale.

#### DISEASES

Cultivated ginseng is subject to attack by several fungus diseases. Excessive soil water, crowding and improper or poor ventilation are factors conducive to disease in plantations. Incorrect fertilization, cultivation or soil treatment may cause injuries or weaken plants and increase possibilities of fungus infection.

The principal fungus diseases of ginseng are: 1. *Alternaria* blight and root rot, caused by Alternaria panax Whetzel, is a serious disease affecting both leaves and roots; 2. *Phytophthora* mildew and root rot, caused by Phytophthora cactorum (Seb. & Cohn) Schroeter, is often a destructive disease on leaves, stems, and roots; 3. *Acrostalagmus* wilt, caused by Acrostalagmus sp., attacks older plants but rarely causes severe damage; 4. *Ramularia* root rot, caused by a species of Ramularia, may ruin seedlings but is less serious on roots of older plants; 5. *Sclerotinia* rots, known as white rot and black rot, caused respectively by Sclerotinia sclerotiorum (Lib.) D. By. and S. smilacina Durand. White rot rarely causes severe damage while black *Sclerotinia* rot may be more serious.

Damping off of seedlings is aggravated by poorly drained and insufficiently aerated seed beds. It is characterized by decay of the stem at the surface of the soil, resulting in the falling over and death of the plant.

Root knot in ginseng is caused by nematodes, which attack a large number of cultivated and wild plants. Care should be taken to see that beds and soils used are free from these pests. Seedlings may be killed and value of mature roots reduced by nematode infestations.

The county agent may be able to advise whom to consult should disease get into the plantings; perhaps the plant pathologist in the state University or Agricultural Experiment Station.

#### YIELD AND VALUE OF CROP

Yields on well managed plantations should average about one ton of dry root per acre, although greater yields are often reported. This estimate is for roots harvested when six years old.

Value of the crop depends on the market at time of harvesting. There are several firms who buy ginseng and other botanicals. A current list of these firms will be supplied upon request.

The Agricultural Research Service, United States Department of Agriculture, has no research program on Ginseng. The information presented is taken from sources believed to be reliable.

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3. *Ginseng*, Brooklyn Botanic Garden with assistance of U. S. Works Progress Administration, 1938.
4. Letters from several firms dealing in ginseng and the information file of Agricultural Research Service, Plant Introduction Section, have all been helpful.

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